REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed June 29, 2006. Reconsideration and allowance of the application and pending claims are respectfully requested.

I. Specification Amendments

Various amendments have been made to the specification through this Response to correct reference numeral errors. Although these amendments effect several changes to the specification, no new matter has been added.

II. Drawings Amendments

Various amendments have been made to the drawings through this Response to correct reference numeral errors. Although these amendments effect several changes to the drawings, no new matter has been added.

III. Claim Rejections - 35 U.S.C. § 112, Second Paragraph

Claims 2 and 14-20 have been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. In particular, the Examiner notes that Applicant further limits something that is explicitly not present in the invention.

In response, Applicant has amended claims 2 and 14 to specify that "hydrogen gas (H_2) is not used in the reaction chamber". In view of those amendments, it is respectfully asserted that the claims now define the invention in the manner required by 35 U.S.C. §

112. Accordingly, Applicant respectfully requests that the rejections to these claims be withdrawn.

IV. Claim Rejections - 35 U.S.C. § 103(a)

Claims 1-24 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over *Semiconductor Energy Lab* ("SEL," JP 05-097583A) in view of *Pryor* (U.S. Pat. No. 5,236,545) and either *Versteeg, et al.* ("Versteeg," U.S. Pat. No. 5,451,260) or *Robson, et al.* ("Robson," U.S. Pat. No. 5,874,014). Applicant respectfully traverses this rejection.

As has been acknowledged by the Court of Appeals for the Federal Circuit, the U.S. Patent and Trademark Office ("USPTO") has the burden under section 103 to establish a *prima facie* case of obviousness by showing some objective teaching in the prior art or generally available knowledge of one of ordinary skill in the art that would lead that individual to the claimed invention. *See In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). The Manual of Patent Examining Procedure (MPEP) section 2143 discusses the requirements of a *prima facie* case for obviousness. That section provides as follows:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable

expectation of success must both be found in the prior art, not in applicant's disclosure.

In the present case, the prior art does not teach or suggest all of the claim limitations, and there is no suggestion or motivation in the prior art to modify the references to include those limitations.

Independent claims 1 and 10 provide as follows:

1. A method of forming diamond comprising:

providing a substrate in a reaction chamber in a non-magnetic-field microwave plasma system;

providing, in the absence of a gas stream, a liquid precursor substantially free of water and containing methanol and at least one carbon and oxygen containing compound having a carbon to oxygen ratio greater than one, *to a metering valve associated with an inlet of the reaction chamber*;

passing liquid precursor into the reaction chamber inlet with the metering valve;

vaporizing the liquid precursor within the reaction chamber inlet to generate vaporized precursor, the vaporizing occurring due to relatively low pressure within the reaction chamber; and

subjecting the vaporized precursor, in the absence of a carrier gas and in the absence in a reactive gas, to a plasma under conditions effective to disassociate the vaporized precursor and promote diamond growth on the substrate *in a pressure range from about 70 to 130 Torr.*

10. A method of forming diamond comprising:

providing a substrate in a reaction chamber in a non-magnetic-field microwave plasma system, the reaction chamber being in fluidic communication with a container through a metering valve, wherein the

container includes a liquid precursor substantially free of water containing methanol and at least one carbon and oxygen containing compound having a carbon to oxygen ratio greater than one;

flowing the liquid precursor into the reaction chamber using the metering valve, in the absence of a gas stream flowing through the metering valve entraining the liquid precursor, *wherein the liquid precursor vaporizes during entry into the reaction chamber due to relatively low pressure within the reaction chamber*;

subjecting the vaporized precursor to a plasma under conditions effective to disassociate the vaporized precursor in the absence of a carrier gas and in the absence in a reactive gas; and

promoting diamond growth on the substrate *at a pressure in the range from about 10 to 130 Torr.*

Beginning with independent claim 1, Applicant notes that none of the references teach or suggest "providing . . . a liquid precursor . . . to a metering valve associated with an inlet of the reaction chamber", "passing liquid precursor into the reaction chamber inlet with the metering valve", and "vaporizing the liquid precursor within the reaction chamber inlet to generate vaporized precursor, the vaporizing occurring due to relatively low pressure within the reaction chamber". Although, as indicated in the Office Action, Versteeg teaches a liquid delivery system, the liquid is atomized using ultrasonic atomizing nozzles. Therefore, Versteeg does not disclose a metering valve that passes liquid precursor into a reaction chamber, or vaporization occurring due to pressure drop. As for the Robson reference, although Robson generally discloses vaporizing liquid upon introduction to a reaction chamber, Robson does not teach or suggest the claimed mechanism or method of vaporizing.

As a further matter, none of the references teach or suggest promoting diamond growth "in a pressure range from about 70 to 130 Torr". Although it is argued in the Office Action that such a range would have been obvious relative to "routine experimentation," Applicant notes that the base reference teachings indicate to the contrary. Specifically, the base reference explicitly identifies a significantly lower pressure range and appears to express a clear preference for that range. As stated in the translation of the reference provided by the Examiner: "an owner magnetic field microwave CVD method is the approach of performing by reduced pressure of 1 or less Torr, and it is because it has been the conditions which a liquid raw material is easy to be evaporated." *Translation of JP 05-097583A*, page 2, paragraph 0011. Accordingly, the pressure range identified in the base reference is orders of magnitude lower than that claimed by Applicant. This amounts to a teaching away from Applicant's claimed range.

In view of at least the above, Applicant respectfully submits that claim 1 and its dependents are allowable over the applied references.

Turning to independent claim 10, Applicant notes that none of the references teach or suggest "flowing the liquid precursor into the reaction chamber using the metering valve, in the absence of a gas stream flowing through the metering valve entraining the liquid precursor, wherein the liquid precursor vaporizes during entry into the reaction chamber due to relatively low pressure within the reaction chamber" for reasons described above. Furthermore, those references do not teach or suggest "promoting diamond growth on the substrate at a pressure in the range from about 10 to 130 Torr" for reasons also described above.

With specific reference to dependent claims 19 and 20, Applicant notes that none of the references teach or suggest "acetone" or "isopropanol".

Regarding dependent claim 23, none of the reference teach or suggest "a temperature measuring device coupled to the tip of the metering valve, wherein the vaporization of the liquid precursor causes the metering valve to decrease in temperature to a temperature value, wherein the temperature value is correlated to a flow rate of the liquid precursor, wherein the flow rate of the liquid precursor into the reaction chamber can be controlled by opening the metering valve to an extent so that the temperature value is obtained."

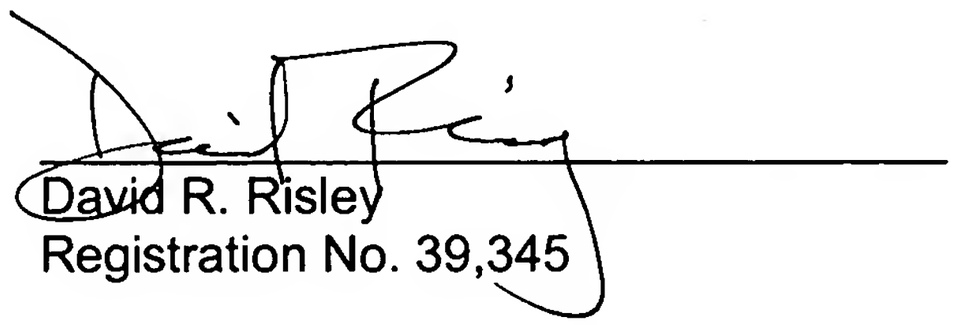
V. Canceled Claims

Claims 15-17 have been canceled from the application without prejudice, waiver, or disclaimer. Applicant reserves the right to present these canceled claims, or variants thereof, in continuing applications to be filed subsequently.

CONCLUSION

Applicant respectfully submits that Applicant's pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted,



David R. Risley
Registration No. 39,345

THOMAS, KAYDEN,
HORSTEMEYER & RISLEY, L.L.P.
Suite 1750
100 Galleria Parkway N.W.
Atlanta, Georgia 30339
(770) 933-9500

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail, postage prepaid, in an envelope addressed to: Assistant Commissioner for Patents, Alexandria, Virginia 22313-1450, on

10-18-06

Mary Meeks

Signature